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CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

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THE SOURCE EVALUATIONS IN THIS REPORT ARE DEFINITIVE.
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Comments.

- 1. Throughout this report, for Krasnoarmeyskiy read Krasnoarmeysk.
- 2. In paragraph 15, Professor Tshorniak is probably Professor Chernyak.

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INTRODUCTION

1. Isolation of the Soviet development program has in the past given rise to much false conjecture on the Soviet Union's capacity. For example, prior to the war there were various conflicting theories in Germany concerning the scientific development and particularly the application of science to armament in the Soviet Union. On one hand it was maintained that the USSR was extremely backward. On the other hand for political or other reasons she was pointed at with awe. In 1936 as a result of the Spanish Civil War, German scientific and armament circles were able to penetrate the veil of secrecy guarding Soviet development. At least they thought they had. German intelligence reports based on Soviet equipment captured in Spain indicated that the Soviet industrial capacity was not capable of sustaining large scale

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armament. This conclusion was based on the frequency with which obvious makeshift constructions were encountered. There was only one exception. Their planes pointed to advances in design and manufacture. The Germans discovered in the civil war that the Soviets had developed a fighter plane (Batar) which was superior to the average German plane used over Spain and the Germans were forced to commit the Messerschmidt fighter. But this limited Soviet success was quickly rationalized with the comment that after all this was the product of foreign engineers whom the Soviets had for years been assiduously enrolling in their development program.

2. Soviet building of solid propellant missiles was not known in Germany. After the outbreak of hostilities in 1941 the Germans were consequently surprised to discover that the Soviets possessed a large number of planes equipped with launching devices for the firing of airborne missiles, indicating the Soviet capability to use the missile on a larger scale. To be sure only a few missiles were actually used, but the fact that launching devices had been built into planes indicated a possible large scale missile-threat.
3. German scientific circles consoled themselves somewhat after the analysis of the first Soviet missiles was made known. The tests showed that the Soviet missiles were not very effective since their weight was high and their capacity low. The Germans observed virtual triangular thrust time which could achieve only about one-half of the acceleration obtainable with the use of a more effective powder. Another consolation was the discovery that the Soviets were still using annealed material in their combustion chambers. This apparently was because their propellants required a relatively high minimum pressure for full combustion.
4. Another surprise of the war was the "Stalin Orgel" (multiple rocket launcher) for use against ground troops. This Soviet "first" again arrived without the slightest warning from the German intelligence services.
5. On the whole it was therefore possible to conclude: a. The Germans were repeatedly surprised by the Soviet capabilities in the field of applied sciences; b. while the Soviets had not advanced technically beyond Germany, it was nevertheless evident that the Soviet military circles had been more adaptive than the German General Staff and had at a much earlier time recognized the utility of rockets and missiles. For the issue under discussion, however, the cardinal point is the fact that the Germans repeatedly miscalculated Soviet ability in the field of armament and scientific development.

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MISSION AND PURPOSE OF GERMAN SPECIALISTS AT KB NO. 3

6. In the Soviet Union I was assigned to KB No. 3, a newly organized Soviet designing bureau. Upon the Germans' arrival the bureau was virtually bare of all furnishings required for development work. This did not improve very much over the six year period. In view of the various surprises that the Germans had suffered, I expected a reasonably well equipped and staffed research installation. I had expected that they would at least have modern test stands, and sensitive measuring methods. Instead I found neither. Repeatedly the Germans learned that these things were far below German standards. For two years the Germans worked side by side with Soviet engineers within the KB No. 3. Even during the period that the Germans worked with the Soviet engineers, they had no opportunity to obtain an insight into the General Soviet mission except for the various assignments which were given to them. The Germans' ability to judge Soviet interest in military development became, of course, still smaller when the separation between the Soviet and German element within KB No. 3 was effected in 1948. The Germans in KB No. 3 then became a closely guarded unit which was separated from their fellow Soviet engineers by barred doors and high fences, and from the Soviet population in general by a form of xenophobia and an official non-fraternization policy.
7. The mission of the German engineers at KB No. 3 was to design in the form of a "Skissen Projekt" weapons that satisfied given Soviet tactical requirements. On the basis of these design studies, the Soviet engineers at KB No. 3 were charged with making engineering improvements to adapt the German design to Soviet industrial capacity or specifications.
8. The German engineers were required in some projects to design certain parts in great detail and to perform comprehensive calculations on the ballistic characteristics of the designed missile. This material was often so complete that it was possible for Soviet engineers of average caliber to complete the project. I was in no position to tell to what extent this actually was done.
9. If this were the mission, the purpose of the German engineers at Krasnoarmeyskiy was to train Soviet engineers in the methods of technical development. Beyond this the Soviets might have hoped that the German specialists would be able to offer new ideas on missile development. I believe it possible that the Soviets planned to use the Germans as a nucleus for an additional and new development institute. Around this nucleus Soviet engineers would be collected, who in time were to absorb the functions of the Germans until the German nucleus was no longer required. In this fashion, an additional research and development institute could be organized at a relatively small financial cost and without diverting Soviet specialists from other Soviet military projects. It must be noted that this mission and apparent purpose

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applied specifically to the KB No. 3. Other Germans in the USSR were used for other purposes. Thus, for example, a group of Germans working in a Soviet fuse factory in Obranovka had the mission of reconstructing a German fuse (fuse No. 66), going into such detail as to make possible the actual production of the fuse.

10. If I am correct as to the purpose of the German engineers at KB No. 3, the chief of KB No. 3 was on the horns of a dilemma. It is reasonable to assume that his superiors kept pressing for news that the Germans had been replaced by Soviets and that the Soviet element of KB No. 3 was capable of satisfying requirements without the aid of the German specialists. Once this had been achieved, the Germans could be separated from the Soviets and in isolation could be given assignments. However these two aims can work at cross-purposes instead of complementing each other. For example, if the chief of KB No. 3, in order to show the efficiency of his own Soviet engineers divorced the Germans from the Soviets at an early period, the training of the Soviets in German development methods was not fully realized. If on the other hand, too much time is spent in the training phase little contribution can be expected from the Germans on new designs.
11. There was another problem which faced the director of KB No. 3 and which probably faced every Institute Director in the Soviet Union to whom German specialists had been assigned. In order to accomplish the project requirements expeditiously and effectively, the Germans required reference data which the Soviets, however, withheld from them. Thus, for example, when working on the "Sokol" project, the Germans required specific aerodynamic data, yet this was not made available to them. Similar instances were repeated frequently during the Germans' six years in the Soviet Union. The reason for Soviet refusal was no doubt based on security considerations. This Soviet search for security constituted a great hindrance for the Germans in their technical work and thus impeded one of the purposes of their stay in the USSR.

SOVIET TECHNICAL PERSONNEL AT KB NO. 3

12. There was a dearth of equipment at KB No. 3. The Soviet technical personnel at Design Bureau No. 3 came from various quarters. The skeleton staff of Soviets, who together with the German specialists in 1946 organized the KB No. 3, was obtained from the nearby Firing Range (S.N.I.P.). Later, the personnel consisted predominately of youthful graduates coming directly from engineering schools. It is very possible that these young engineers were sent to the Design Bureau for the purpose of obtaining practical experience in the various phases of missile development and that they were destined to specialize in missile work in the future. These young engineers are the Soviets who were generally referred to as "Ingenieur" or "Ingenieur-Techniker" by

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the German specialists. Their number at the KB No. 3 was 12-15. These graduates had a nine year education followed by a formal technical education lasting between three and four years. Very often this formal training period was interrupted by a period of practical training in an industry. The young engineers at KB No. 3 were somewhat older than what might be expected. This may be due to the interruption in studies caused by war service. Details of their formal training are not known to me. While I have no details on the study program in the technical schools, the German specialists were often amazed by the elaborateness of the curriculum. For example, complex stress relationships were taught on a relatively low level and in great detail. The Germans therefore concluded that the present generation of graduates would be in a position to do good work. However the Germans were often dismayed to find that graduates with this background were not in a position to apply in practice their theoretical knowledge.

13. While I believe that the young Soviet engineers received their first specialized training for missile work at KB No. 3, the Design Bureau was not organized as a "school" in the ordinary meaning of the word. There were no regular classes, nor was there a periodic turnover, or a defined period that the engineers had to serve at the KB No. 3. Some engineers remained there for as long as five years. I did not know the policy which governed the assignment of the graduate students to the Design Bureau. The relatively low caliber of the young engineers makes it unlikely that aptitude governed their selection to missile development.
14. In summary the Soviet graduate engineers that I encountered were often theoretically well equipped but seldom, if ever, capable of applying this knowledge to the practical problems that faced them in design work.
15. Aside from a few isolated cases, the Soviet engineers with whom I worked in KB No. 3 did not seem to possess creative ability and tried to compensate for this lack by increased meticulousness. Another characteristic which I observed among the Soviet engineers was the frequency of attempts to plagiarize the contribution of others and take credit for work which they had not performed themselves. Characteristic of the mediocre engineers at the Design Bureau (of the caliber of FRIEDMAN) was their concern with advancement. This desire for improvement was not so much in connection with applied engineering or the obtaining of knowledge through gradual experience, but rather in the form of formal study. The fact that the Soviet formal study places a disproportionate emphasis on such subjects as philosophy or political theory does not make the Soviet engineer any more capable in engineering. It may be symptomatic of the Soviet Union that engineers of average caliber will seek to advance not by

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way of technical proficiency, but rather through the study of Marxism. Even high caliber engineers, such as Professor TSHORN-IAK, specialist in kinematics in Moscow, found it necessary to give a political testimonial as a preamble to their publications. As part of my estimate of the Soviet engineers and in view of the apparent purpose of the German specialists at KB No. 3 (i.e., training of Soviet engineers), it is interesting to note the attitude of the mediocre and lower ranking Soviet engineers, technicians and workers to the Germans. There were some Soviets who exhibited great interest in learning the German methods of design and their approach in solving engineering problems when applied to missiles. On the other hand, there was a very large number of Soviets who seemingly disregarded the Germans. As a result of the official indoctrination, they felt that the Soviet was an inventor and that the Soviet was superior to all other nationals in technical matters. The German approach, this group thought, was too complicated, while the Soviets could solve technical problems with greater simplicity. On the whole, it appeared to be beneath the dignity of this group to approach the German specialists with any requests for information. This group was found only among the mediocre technicians.

16. At this point I made the interim conclusion that if all institutes for the development and research in the Soviet Union were equipped, staffed and operated as the KB No. 3 in Krasnoarmeyskiy, the last war would have been over before the first tank had left the drawing boards. The fact is, however, that they did have tanks and that they do have the atomic bomb. The obvious conclusion therefore is that the personnel at the KB No. 3 were not representative of the research personnel available to the Soviet Union. A simple explanation for this contradiction is, of course, deception. Another explanation might be obtained from the following parallel. In the early thirties many steel mills were rapidly constructed in the Soviet Union. Often this was done with the aid of German industrial enterprises that had sent their specialists to the Soviet Union. Upon their return they offered as their consensus of technical opinion that it would be impossible for the Soviet Union to smelt high quality steel because the impurities of the standard steel were such as to make it unsuitable for further refinement. This opinion may have been correct for the time that the plants were commencing operation. After the foreign specialists left, the Soviets, however, did not mark time, but gradually improved the quality as they gained experience. Similarly, if I were to base my evaluation of the Soviet development program on my observations in Krasnoarmeyskiy, I would commit the same error that the returning steel specialists committed in the early thirties. Another mistake which is often made in regard to the Soviet Union is the belief that the Soviets for reasons of prestige must of necessity show the world that it is not backward. On the contrary, it would seem just as likely that the Soviet Union thinks to profit more by deceiving the world into believing that it is technically backward. The historical parallel here, of course, is the Soviet-Finnish war.

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GERMAN CONTRIBUTION TO SOVIET MISSILE DEVELOPMENTCalculation process for the determination of various influences on target dispersion:

17. I thought that this process which was developed by the German specialists, BACHMANN, TAEUBERT and myself was new to the Soviets and had not been known in Germany. I refer to the process by which estimates are made on the hit probability, taking into account the influences due to inaccuracies such as off-center thrust of the jet, or the off-center of air forces resulting from asymmetry in manufacture.

Multiple shock diffusion

18. The oblique compression shock at different pressure intervals is very sensitive to variations in speed. In Krasnoarmeyskiy Dr. TROMMSDORF for a long while sought to find the shape at which the compression wave was absorbed as parallel as possible. This material on aerodynamic and thermodynamic procedures at supersonic speeds was collected by TROMMSDORF in the form of tables so that for every shape, he could graphically find the applicable relations and thus in a relatively short time obtain the exact flow relationships around a body. This work was addressed of course to a specific requirement. However Dr. TROMMSDORF's study was of such a nature as to make it universally applicable.
19. It must be noted here that the only problems that remained on the project "Fluse" in Berlin during 1945 and 1946 was the question of the drag of shaped bodies and how much air would flow through the interior of such a body. (The original design in Berlin had been based on simplified mathematical formulas which gave the performances of the propulsion unit at various altitudes and at different Mach numbers. These simplified formulas, however, could give nothing more than the approximate dimensions of the over-all missile.) I am certain that with the aid of the TROMMSDORF material and using the design which the Germans supplied at GEMA during 1945 and 1946, the Soviets should be capable of producing the "Fluse" missile, i.e., independently satisfying the requirements that were given to the Germans shortly after the war in Berlin. This is true in spite of the fact that the Soviets obviously distrusted the validity of TROMMSDORF's work.

Remote control missile

20. I thought that the Soviets received a considerable boost from the Germans in the field of remote controls through their work on the "Sbkol" missile at KB No. 3. They evinced much interest in the missile, and I thought that they generally received valuable advice on questions of aerodynamics and design.

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Absence of current foreign technical literature

29. Regarding technical literature, no written reference material was available upon the Germans' arrival at KB No. 3. The Germans were requested to draw up lists of material needed in a library. In the course of the ensuing years, many volumes arrived. The library was by no means complete. Particularly needed were texts on contour measurements at subsonic and supersonic speeds, and also aerodynamic measurements for cylindrical and ogival bodies. In addition, the German specialists were required to carry out detail designing work which could have been more economically performed by assistants; also, there were few labor-saving devices and an insufficient number of assistants.

SOCIAL ATMOSPHERE

30. The Soviets could have made much more efficient use of the German specialists if their method of treatment had been different. As it was the Germans always felt like prisoners. There was, for example, the interdiction against free movement. The Germans were permitted to move without escort only in the radius of a short walk from their residence. All other travel, however required the presence of a Soviet from the MVD section of Krasnoarmeyskiy. In addition the Soviets apparently carried out a non-fraternization policy which gave the Germans the feeling of being pariahs. This of course affected the German bachelors who found that each time they had formed a liaison with a Soviet girl, the girl would soon disappear. It is interesting to note that this Soviet method in human relations had at times a rather boomerang effect. The specialist, BOEHM, for example, had arrived in the Soviet Union resolved to view the system objectively and became bitterly disappointed. Strangely enough the Germans had all come to the Soviet Union prepared to look kindly on the Soviet Union as a result of the possible exaggerations of [] propaganda and the fine impression made by some Soviet engineers in Berlin. The Germans' disappointment during the six years in the Soviet Union, however, was such that they felt the Goebbel propaganda was not exaggerated.

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31. In regard to social atmosphere, a very important point was the uncertainty which surrounded the Germans' work relationships. At the time of my conscription in Berlin, I was summoned to a group of Soviet generals who told me that a contract had been drawn up for me and other German specialists to work in the Soviet Union for two to three years, or at the most, five years, at a salary of 5,000 rubles per month, and that the salary would be changed at an especially favorable rate of exchange. The contract contained clauses on special living quarters and the Germans' work relationship was outlined in regard to social security, etc. The Germans were never able to make use of this contract while in the Soviet

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Union. Upon our arrival in Putilovo the Germans proposed a new contract because the Berlin document had not been sufficiently detailed and had not provided for emergency cases such as the death of the provider, etc. This the Soviets rejected. When the Germans asked for contract clarification, the Soviets would evade their questions or become surly, commenting that the Germans had come to the USSR to work and not to play. In some institutes the treatment was still more drastic, and this question was answered with the threat that the first echelon of Germans was being tried in Nuernberg and would be hanged and that the second echelon was in the USSR and had to work.

32. Still another method was used by the Soviets to foil our requests. Shortly after the Germans' arrival in Krasnoarmeyskiy, the Soviets announced the salaries of the German specialists. Accordingly I was to receive 8,000 rubles per month. In view of this great increase over the contractual salary of Berlin, I was no longer in a position to pursue the campaign for a special contract covering work conditions.
33. The conclusion therefore is that the Soviets did not exploit the Germans efficiently, and had they worked six years in Germany, they would have been able to perform 50 per cent more, although the direction that their work took in the Soviet Union was the direction it would have taken normally. Furthermore even the German mission of training Soviet engineers was not carried out by the Germans as an effective exchange of information between the German specialists and the inexperienced Soviet technicians were prevented by organizational policies.

DESIRABLE AND UNDESIRABLE FEATURES OF SOVIET DEVELOPMENT PROGRAM

34. One technological aspect which the Germans found relatively far progressed in the Soviet Union was the purely theoretical estimation of the hit probability and particularly the study of the effect of manufacture on target accuracy. For example, manufacturing precision was strictly codified into four or more classes. Assuming class III to be more precise than class IV, the Soviets were in a position to pose the question: "If in place of category III, the precision category IV is used, how many manhours will be economized and conversely, how much more fire is required with the poorer performance in order to accomplish the effect of the higher grade manufacture?" This development interested the Germans since they had not encountered this in Germany where the industry was assigned a reasonable tolerance and their calculations simply assumed this given tolerance. If the tolerance did not offer sufficient accuracy, the manufacturers' tolerances were simply more circumscribed. In the Soviet Union this experimentation apparently has been discarded in favor of the codification of norms which make possible a theoretical treatment with various different classes.

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Such a mathematical treatment was required of the Germans on every project they worked on at KB No. 3. The category usually required for the German missile work was Grade III, which roughly compares with the German fine fit. Details are no longer known to me.

35. An institution which I found widely distributed in the Soviet Union and which I considered valuable was the technical soviet. An individual, group, enterprise or institute, wishing to engage in a new project must first present the basic ideas and principles in front of a larger gathering of technicians and other interested parties. To some extent, this prevents the misappropriation of funds of human resources on fantastic or unrealizable schemes. I felt that many of the numerous projects, which dispersed and side-tracked German wartime scientific manpower and other resources, would not have been pursued had the proposals first been reviewed by such a panel of interested parties.
36. The Germans found upon their arrival in the Soviet Union in 1946 that large quantities of technical literature were in circulation among the populace dealing with missile development. In Germany this knowledge had not yet been distributed in the form of text books or journals. The Germans had treated such material either as military secrets or as industrial secrets of the various plants engaged in missile development.
37. The latter, however, was not an unmixed blessing, especially in the Soviet Union where the wide distribution of the publications on elementary missile development seemed to lead to an unimaginative standardization. Insofar as publicized methods become accepted as a standard sine qua non, they lead to mediocre design. This tendency is especially strong in the Soviet Union where it is feared that a failure in using a new approach can result in the accusation of sabotage or at best in a reduction of salary. Consequently this leads to an acceptance of the old tried and proven, although the old may result in relatively poor performance.
38. This check of initiative can, of course, be compensated for by the establishment of special institutes whose sole function is the search for innovations. That such institutions exist seems to be borne out by the comments made by Soviets at KB No. 3 who would at times block the German theoretical investigations with the remark that "we (KB No. 3) are not a research institute. Our work is to supply concrete development." It is clear that this meant for the Germans to apply the tried and proven in our designing projects.

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39. Another detrimental feature which I had alluded to earlier was the present government indoctrination program. Accordingly all discoveries are ultimately traced to the Soviet nation. This leads to the delusion among many Soviets that they know everything better than everyone else. Even the dullest will actually resist studying the work of others in the belief that the Soviets can do better. This indoctrination is, of course, not taken seriously by the government which cynically organized a vast translation staff in Moscow for the sole purpose of translating western technical literature into Russian in order to extract and apply western discoveries in their own work.

PRIORITIES IN MISSILE DEVELOPMENT ASSIGNED BY SOVIETS

40. Judging from the assignments handled by the German specialists at KB No. 3 and on the basis of the interest evinced by top Soviet engineers and also on the basis of the relative urgency with which the projects were treated, I would like to draw the following conclusions regarding over-all Soviet interest in missiles. Again I warn that "urgency" is a very poor criteria for this purpose, since the Soviets emphasized urgency with every assignment they issued to the Germans. This seems to have been, however, only a device designed to speed up the work of the Germans and not necessarily a criteria for the relative importance of the various projects.
41. Of highest priority was the "Sokol" missile. This missile was remote controlled, and I believe a special committee with virtually limitless funds exists in the Soviet Union for the development of controlled missiles. I base this on the fact that when the Germans began working on Rheintochter in GEMA, Berlin, they suddenly had at their disposal much greater financial and human resources than earlier. At that time, I was told that this specific project (Rheintochter) was supervised by a "special committee." I also learned at the time that even unskilled workers assigned on the remote control missile projects received higher wages for the same work than did others working on non-controlled projects. I can give no further information on this "special committee" except that this committee may have farmed out the preliminary work on "Sokol" to the Ministry of Agricultural Machine Building; i.e., KB No. 3, and that the "Sokol" project reverted back to the central commission after the completion of the Germans' work. This, however, is pure conjecture. Of interest might be the comment of the chief of KB No. 3 in regard to "Sokol". He stated that the German design was very modern and that it mirrored the development stage of 1954. He stated however, in characteristic Soviet manner that in the future he expected designs from the Germans that would reflect the world development level of 1956 and 1957. This comment was made in 1948.

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42. Next in priority came the ABRS 220. I base this high priority partly on the fact that parallel work on this project was conducted in another exclusively Soviet institute. Since the 300 mm Ring Magazine missile was virtually a variation of the ABRS 220 I thought that it too had equally high priority. Next in order were the "Molnya" and "Zenith" missiles.
43. A weapon for the effective combating of planes from the air probably did not exist in the Soviet Union prior to 1946. Therefore the great interest of the Soviets was in the R-100-BS (reconstructed in Berlin) and its variants, the ABRS 220 and the 300 mm Ring Magazine missiles. The Soviet interest and probable parallel work on the 300 mm magazine missile is evidenced by the actual flight tests of this missile which I accidentally observed over Krasnoarmeyskiy during the year 1949. Furthermore the Soviet concentration on air-to-air weapons is documented by the interest shown in the automatic rocket.
44. The Soviets did not have an effective ground-to-air missile against bombers, and generally speaking the development of controlled missiles has not as yet found an effective solution in the USSR. I based this on the announcement the Soviets made in 1949 that the Germans would have to resume work on the "Zenith" missile with some changes in tactical requirements. This announcement came one whole year after the Germans had turned in their work on that missile during which time I thought the report was pigeon-holed and not forwarded by the chief of KB No. 3. This intended revival of the "Zenith" project (which was never realized) seems to reflect Soviet weakness in ground-to-air missiles, especially since the German version of "Zenith" incorporated rather expensive features in regard to materiel expenditures. The German specialists had always regarded the requirements of the "Zenith" as a transitory solution until an effective remote-controlled weapon was available, since the extreme altitudes of the latest planes make the hit probability of a "Zenith" like missile relatively poor.
45. I believe that until at least 1948 the Soviets did not have an air-born weapon against armored ground targets such as tanks. I base this on the belief that the Soviet element within KB No. 3 worked on the Molnya Project until 1948. After the German specialists had completed their work on the "Molnya", the Soviets in KB No. 3 continued to work on the project independently of the German specialists. While the Germans had worked on the project, they had despaired of finding a solution to the problem of picking up, tracking and aiming at the target. The fact that the Soviets, in spite of this blank in the design, continued to work on the project "Zenith" may indicate that they did not have a satisfactory weapon for air-to-ground purposes.
46. Soviet interest in an anti-tank weapon with larger ranges is evidenced by their repeated assignments of "Panzerfaust" projects to the SCHAADT-BOEHM Group at KB No. 3. I remember that the weight requirements of the Soviets gave the German Group great difficulties. Concerning its tactical nature I can only remember that it was to be used by infantry and that it was to be operated by one man. The Soviets also insisted on the use of shaped charges for this weapon.

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47. The work of TROMMSDORF [redacted] on ram jets interested the Soviets, and I felt that parallel work was performed by them along this line. Details, however, are not known to me. 50X1-HUM
48. In 1943 the Soviets were forced to use high grade material because they were still using very high gas pressures in the range of 300 atmospheres in their combustion chambers. Thus, the cost of manufacture prevented the Soviets from making large numbers of missiles. Improvements were made, however, and upon our arrival in the USSR in 1946, we were given propellant powder sticks that possessed combustion chamber pressures in the range of 100 to 130 atmospheres.
49. In spite of these improvements the stage of Soviet missile development at the end of the war was comparable to the early stage of German missile development reached in 1936 and 1937. I am in no position to make any comments on Soviet missile advances after 1945, except for the few inferences that I have made earlier.

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